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BIOLOGY

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America's Game Birds and Animals Coming Back

PRONGHORN ANTELOPE on the Wichita National Forest, Oklahoma. These beautiful animals, whose herds used to outnumber even the vast masses of bison, are struggling to keep their hooves on the up-grade from near-extermination which they faced a decade ago

Hunting weather in the fall, with the beginning of open seasons in sight, always sets sportsmen to oiling up their guns and getting their gear together. Also, it always sets thoughtful ones to asking, how long are hunting days going to last? Is American game dwindling to the vanishing point?

Old-timers, who can recall the days when the buffalo herds of the West made the earth tremble under their avalanches of hooves, shake their heads sadly and declare that America is all towns and factories now, all plowed farms and fenced ranches, and there is no place left for deer or elk or pronghorn. Even the smaller animals are vanishing, and all the birds worth hunting are going, too.

To a very large degree, they are quite right. The days of vast game herds that no man could count, of free and unlimited shooting, of "bags" that would fill a wagon, are gone forever. It was inevitable that they should go. When the city-building Caucasian came to this all but unpopulated continent, and increased and multiplied along its coasts and through its unimaginably rich interior valleys, something had to give way. It is only the simplest of geographical logic that you can not have a Pittsburgh and a deer forest on the same spot, and that beef cattle and bison can not feed on the same range.

The tragedy of the depletion of the American game herds does not lie in their passing. It was the excesses that the pioneers often committed, the shocking and sickening waste of life—at least so it seems to us now—of which they were guilty in the cases of such animals as the bison and the pronghorn and the

(*Just turn the page*)

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American Game Returning

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passenger pigeon. Nothing ill was thought of such slaughter at the time. Indeed, Buffalo Bill, one of the greatest of our boyhood heroes, got his name because he could kill buffalo so fast, to supply meat for the builders of one of the great transcontinental roads.

The most colossal tragedies, those of the bison and the pronghorn antelope, came last, brought to a frenzied climax by means of the repeating rifle, which had been invented for war and proved only too adaptable for hunting. The sudden reduction of the apparently endless herds to a few straggling pitiful hundreds shocked the people of the nineties into a realization that wild flesh and blood could not stand up forever against powder and lead.

A New Deal

Vehement reaction set in. Some of the things we did in those days were sentimental and ill-advised, but after the pendulum had come back a little way from its extreme swing, the direction of conservational action was on the whole beneficial for both the game and for the hunters thereof. Game laws, closed seasons, game refuges, permanently closed sanctuaries like the national parks, have all been of incalculable service in saving our wild species alive; but the most potent agency, after all is said, has been public opinion. A man who kills a wagon-load of animals or birds is not given a special hero-name now; he gets a special name, all right, but the name is just plain Game Hog. To shoot your needs, not to shoot the limit, even the legal limit, is the newer standard of sportsmanship.

These restrictions on shooting, both law-imposed and self-imposed, are having their effects in the increasing numbers of game animals, and even in their return to ranges formerly abandoned. Testimony comes in from every side that most game species are very noticeably on the up-grade again. Their one-time ranges in the forest and on the plains have been reduced to mere fragments, but in what is left to them of their old homes the shy wild things are once more hopefully taking hold.

U. S. Forest Service Game Census

Probably the most complete and accurate large-scale game census ever taken is the one compiled by Will Barnes, of the U. S. Forest Service. Counts for his census were made by hundreds of rangers in our national forests, and cover a period of five years. While it includes only the animals in the national forests, it may be taken as a fair cross-section of the game conditions over the country generally, for the national forests are scattered over a wide domain in the East as well as in the West.

Mr. Barnes' figures for deer show a marked increase even in the few years covered by his study. At the beginning of his five-year period there were 452,555 of these animals in the national forests, and at its close there were 605,964. This represents an increase of approximately 30 per cent, a most astonishing and gratifying figure.

It is quite probable that the deer outside the national forests are increasing rapidly also, though complete figures of course are not obtainable. Farmers in some of the middle western states are complaining that the deer there are raiding their crops, and one observer in the abandoned-farm area of New England says that the forests are taking back the lands once won from them, and that the deer are coming in with the new growth.

Deer are the most widely distributed of all the larger game animals, but within their present restricted

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METALLURGY

Beryllium to Rival Aluminum

Airship frames and light-weight pistons may soon be made from beryllium or its alloys, and this hitherto unknown metal may soon achieve the household familiarity that aluminum has won during the last two or three decades.

Beryllium is a metal about a third lighter than aluminum, but is very much harder, scratching glass easily, like hard steel. According to H. S. Cooper, industrial chemist of Cleveland, Ohio, it is one of the most remarkable of all metals in its elasticity. It is over four times as elastic as aluminum, and 25 per cent. more elastic than steel. And while aluminum corrodes easily on contact with salt water, beryllium shows very high resistance to this as well as to other metal-destroying liquids and fumes. It is light gray in color, and takes a polish like that of high grade steel.

It is chemically related to aluminum, and easily forms alloys with it. One of these, consisting of 70 per cent. beryllium and 30 per cent. aluminum, is one-fifth lighter than aluminum, far more resistant to corrosion, and in tensile strength far exceeds duralumin.

One quality which Dr. Cooper points out may render beryllium especially valuable to the automobile industry. It expands under the influence of heat at about the same rate as cast iron. Thus when used for light pistons inside the iron cylinders of automobile engines it will present far less engineering difficulty than do the present types of light pistons, which expand at a rate different from that of iron.

Beryllium ores are found abundantly both in this country and abroad. At present they are hauled out of feldspar mines in New England by hundreds of tons, but are dumped away as waste.

Although so new industrially that it can not properly be said to have been born yet, scientifically beryllium is an old story. It has been known to chemists for 130 years; Vauquelin, a Frenchman, first indicated its existence in 1797. But until recently it has remained merely a museum curiosity and a laboratory material, because it is so refractory that the cost of getting it in anything like a pure state has been prohibitive. But now that the cost of manufacture promises to be materially reduced by a new electrolytic process, it is probable that it will appear on the market in quantity.

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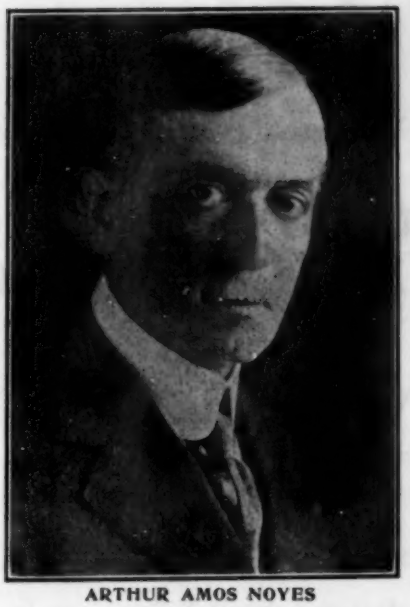
CHEMISTRY



ARTHUR AMOS NOYES

Chemist and Educator

When the executive council of the American Association for the Advancement of Science last winter reached out to the Pacific coast and chose Arthur A. Noyes as president during 1927, everybody applauded the selection as well made. For in the threefold role in which a scientist must qualify today to be considered a leader, Dr. Noyes has most notably made good: as investigator, teacher and administrator his reputation is solidly established.

Every analytical chemist is a searcher after needles in haystacks. Dr. Noyes delights in the smallest of needles concealed in the largest haystacks, for his specialty has been the detection of the barest traces of the rarer metals. Where enough of an element is present to make quantitative analysis the delight of the chase is gone for him, and he resigns the job to some one else. His chase of vanishingly small quantities has led him also into studies of what happens to ions in electrolytic solutions.

Two institutes of technology on opposite sides of the country, Massachusetts and California, have profited by his talents as a teacher. But his teaching has not been conducted from behind his own desk, for he has written and collaborated in the writing of a number of successful text and reference books, in addition to his contributions to the literature of research.

Where he has taught, he has also led the teaching. He was director of the research laboratory of physical chemistry at the Massachusetts Institute of Technology from 1903 until 1920, and for two years acted as president of that school. Then in 1920 he was called to the directorship of Gates Chemical Laboratory at the California Institute of Technology, Pasadena.

Dr. Noyes was born at Newburyport, Mass., in 1866. His education began at the Massachusetts Institute of Technology, where he received his bachelor's degree in 1886 and his master's degree one year later. He went to Germany for his Ph. D., which he received at Leipzig in 1890. He holds honorary degrees from the University of Maine, Clark University, the University of Pittsburgh, Harvard University and Yale University.

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GENETICS

Genes And Genomeres

Just as the atom, the standard "indivisible particle" of the earlier chemistry, has been split up into electrons, so the gene, the standard carrier of a given hereditary quality, is now split into new subdivisions called genomeres, to satisfy the requirements of phenomena which the orthodox genetical concepts of the present day can not explain.

At the Fifth International Genetics Congress at Berlin, Prof. William M. Eyster of Bucknell University told how his studies of variegations, or contrasting colors appearing in the leaves and flowers of plants, led him to the adoption of the genomere hypothesis. The standard concept, that genes were indivisible hereditary units, could not account for these stripings and spottings, and the only thing to do was to think of the gene as cut up into sub-units, which usually hang tightly together, but which on occasion can come apart and rearrange themselves. When they do this, they form a sort of genetical mosaic, which expresses itself in the mosaic appearance of the plant itself.

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HYGIENE

"Trying On" Dangerous

When a woman tries on a dress in a store before deciding whether or not she will purchase it she runs into danger, according to the New York City Health Department.

The practice of trying on clothes has been deprecated by the Health Department in one of its recent bulletins. And the department is not concerned with the increased wear and tear on the clothes. Rather it is alarmed at the possibility of spreading disease which such fittings may lead to. The department warns retailers of the danger and advocates the provision of sterilized slips for try-on purposes.

Science News-Letter, September 17, 1927

The B N A

Arranged as an Outline of

Regional and Systematic Anatomy

A Contribution to the Science and Teaching of Anatomy

BY

Victor E. Emmel

Professor of Anatomy, College of Medicine, University of Illinois
Laboratory Guest at The Wistar Institute of Anatomy and Biology

REVISED SECOND EDITION

The Basle Anatomical Nomenclature (the B N A) has been preeminently successful in the elimination of approximately 45,000 unnecessary synonyms for the microscopic structures of the human body, and has consequently become an international anatomic language.

This list of some 5,000 terms, intended for common use in the medical schools, was arranged on the basis of systematic human anatomy.

It appears obvious, however, that, from the standpoint of practical anatomy, a regional arrangement of these terms in conjunction with their systematic tabulation would greatly increase the usefulness of the B N A.

With this objective in mind, the present systematic B N A has been expanded to include a correlated regional arrangement of anatomical terms—an arrangement based upon the sequence in which the structures indicated by these terms may be exposed and demonstrated to the naked eye in actual dissection—thus securing a direct association of the term with the visualization of the structure to which it refers.

Although a minimum encroachment upon individual initiative is evaluated as a dominant objective to be sought, concise statements are given for the more difficult incisions and dissections involved in the demonstration of the structures listed. The order in which the regions are dealt with is based upon a sequence which facilitates observation of those structural relationships of greatest practical significance. The work consequently constitutes a basis for a direct correlation of anatomical terminology and structure in the practical study of the cadaver and presents a résumé of regional and systematic anatomy for anatomical and clinical reference.

This book of about 250 pages, illustrated with twelve plates and figures in delineation of surface anatomy and surface projections of the skeleton, will be ready September 15, 1927. Price, $3.50, bound in cloth.

Address

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Making the Most of Our Natural Resources

By Edwin E. Slosson

That the United States may sign a declaration of independence of European control of potash fertilizers was the cheering message brought to the meeting of American Chemical Society at Detroit by Prof. E. P. Schoch and H. E. Sellards of the University of Texas, who discussed the details of the discovery of immense beds of potassium salts in Midland County, Texas. Here the Standard Potash Company of Dallas has just completed their second cored well and struck the same beds as their first well three miles away. At a depth of 1980 feet an eleven-foot bed of soluble salts was found, mostly potassium sulfate, carrying ten per cent of the fertilizer ingredient, potassium oxide. Below the 2150 level the drill ran into layers totaling eight feet of a still richer sulfate, polyhalite, which carries sixteen per cent. of potash. The sulfates are better material for plant food than the chlorides contained in the European beds. The depth of the Texas beds is greater than those worked in Stassfurt, Germany, and Alsace, France.

Post-War Monopoly

Before the war the world was mostly dependent upon the German mines for potash fertilizers and when France took over the Alsace deposits it was at first hoped by American farmers that competition would bring down the price. But the Germans and French while political enemies proved to be financial allies and so the European monopoly remains until the southern fields give America a home-mined source of this indispensable plant food.

Another of our undeveloped natural resources is also likely soon to be made available. This is the lignite or brown coal of which extensive deposits are known in North Dakota and Texas. The utilization of this fuel has been impeded by its high amount of moisture and its friable structure. But Dr. Schoch has invented a process that will dehydrate lignite in lumps by heating it in heavy oil. The experimental plant now in operation turns out ten tons a day in a form suitable for furnace or domestic use.

The Conversion of Coal

The world is entering upon a new era in chemistry when coal and oil will not be burned up in their natural form but will be used as the raw material for making more valuable substances. There are many reports of researches on the new methods of liquefaction of coal and its conversion into artificial motor fuel or alcohols, such as have been recently developed in Germany and France. The first step in the production of such synthetic substances is usually the combustion of coal in a limited current of air to form carbon monoxide, which is the poisonous component of automobile exhaust gases, but which may be made into a substitute for gasoline in making the auto go. The laboratory of the U. S. Bureau of Mines at Pittsburgh has been experimenting on the effects of various compounds of cobalt, copper and other substances acting as catalysts to promote the combination of the carbon monoxide with hydrogen to produce methanol and liquid hydrocarbons out of these two gases. The higher the pressure the better the yield. In the University of Michigan Prof. Alfred H. White and Frank W. Hightower have been studying the use of nickel as a catalyst in converting a mixture of carbon monoxide and hydrogen into methane, which formerly was found free in this country in the form of natural gas but which is now getting scarce.

Another triumph of synthetic chemistry was announced by Dr. William J. Hale and Dr. E. C. Britton of the Dow Chemical Company, Midland, Mich. This is a new and more economical method of making phenol from benzene by the action of chlorine or bromine compounds at high pressure and temperature, four thousand pounds and 650 degrees Fahrenheit. Phenol, more commonly known as carbolic acid, is chiefly used in the manufacture of bakelite, which is extensively employed for insulation in electrical apparatus and as gear material in automobiles. The other component of bakelite is the familiar disinfectant, formaldehyde, which may be made synthetically from coal. The United States consumes about fifteen million pounds of phenol a year.

More About Automobiles

The future of the auomobile has naturally filled the minds of many of the members of the American Chemical Society. What will be the next step? was a question often discussed.

First and most fundamental is, how long will the fuel hold out? According to J. B. Hill of the Atlantic Refining Co., Philadelphia, the most vital problem is producing "a substitute for gasoline. While there is no immediate prospect of serious gasoline shortage, it is nevertheless certain that the petroleum resources of the world are not inexhaustible and that the time will come when we must have another source of motor fuel to supplement or replace gasoline."

Two methods of making gasoline artificially have been worked out in Germany. The Bergius process gets forty gallons of motor fuel from a ton of coal by employing hydrogen under a pressure of three thousand pounds per square inch. The Fischer process makes from water gas a liquid sold as "synthol."

Importance of Rubber

"The railroad owes its early growth to the lack of rubber chemistry and the automobile to its discoveries," said William C. Geer, of New York, For the first self-propelled carriages were truly boneshakers. Twenty-five years ago a tire that ran 4,000 miles was regarded as a good investment. Today the tread will stand 10,000 miles and the cord twice that. A tire has to stand some ten million flextures in ten thousand miles.

No other substance is so tough as tire material. Steel gives way in a tenth the time. Brass or leather would wear out much sooner. But Mr. Geer predicted still lighter and tougher tires in the future, also tubing insoluble in gasoline and oil and rubber paints to which water and ice will not cling. He saw no need for synthetic rubber but Charles F. Kettering of General Motors was more sanguine on this point. He said that he did not believe that the rubber tree had in mind the needs of the tire manufacturers when it developed its lymphatic system any more than a hen laid eggs for omelets. Sometime the chemist may improve upon rubber or even make a better fried egg.

The possibility of getting your automobile repainted while you wait and changed to match your lady's

(*Just turn the page*)

Using Natural Resources

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gown comes from the invention of synthetic lacquers in place of the old varnishes made from natural gums and resins. These lacquers are mostly made from cotton by the action of nitric acid and dissolved in mixtures of various alcohols, ethers and oils. A new synthetic resin made from coal-tar naphthas was commended to the chemists by Prof. Allen Rogers of Brooklyn and Clifford Banta of Philadelphia. It is called cumar, is cheap and gives a hard glossy surface, waterproof, acidproof and alkaliproof to a high degree and therefore very resistant to weather.

Anti-Freeze Compounds

The specifications for the ideal anti-freeze compound were presented by Prof. D. B. Keyes of the University of Illinois. The chemists are in search of something to prevent the freezing of water in the radiators at any expected temperature. It should not corrode any of the metals about the engine or rot the rubber. It should not smell bad or attack the lacquer. It should keep well and not cost too much. It is hard to find a chemical that will not fail in one or more points. Salts such as calcium chloride corrode all comon metals. Sugar is sticky stuff. The alcohols vaporize too easily and besides methyl alcohol gives off poisonous fumes and ethyl alcohol has a tendency to be turned to other purposes. Glycerine thickens up too much in cold weather and the supply is limited since it is made from soap fat. Another compound hitherto known only to the chemists has more advantages and fewer disadvantages. This is ethylene glycol, which is a cross between alcohol and glycerine. It freezes at lower temperatures, does not clog up the radiator pipes, or reduce the boiling point of the water and can be made in unlimited quantities from cracked petroleum. But it does soften rubber and has a high initial cost.

Safer Kinds Of Glass

The need of the automobile for plate glass has led to the rapid development of this industry until now about half of the plate glass made in the United States goes into autos and the industry ranks fifth in value. But E. Ward Tillotson of the Mellon Institute, Pittsburgh, pointed out that the automotive engineer wishes he could find a less breakable glass. Several large companies are now experimenting with a laminated glass, composed of two sheets of thin plate glass with a sheet of celluloid cemented in between. Such a sandwich sheet is less liable to be shattered by a shock and when it is cracked the fragments of the glass do not fly about since they are stuck to the middle sheet. But the celluloid is apt to become yellow by sunlight and peel off at the edges. The composite plates are of course more costly.

One of the novelties in auto glassware is a rearview mirror by which the driver can see the cars following but is not dazzled by the glare of their headlights. The reflecting surface is made of lead sulphide instead of silver and cuts out more than sixty per cent of the brightest rays.

The Chemistry Of Life

The resurrection of the dead is no longer a miracle. It is in some cases the achievement of modern medicine. Recently a youth who had been lifeless for fifteen minutes was revived by an injection of adrenalin. In the future many persons will be likewise resurrected. But such renewals of the vital processes cannot be expected in all cases, any more than every dead auto can be started by cranking. So death remains in the end unconquered.

This was in substance the announcement with which the session on biochemistry was opened by M. L. Crossley, chairman of the division of dye chemistry.

This was followed by the discussion of a question almost as startling, for Prof. Treat B. Johnson of Yale considered the possibility of the origination of life in the laboratory. He quoted Huxley's anticipation in 1870: "I think it would be the height of presumption for any man to say that the conditions under which matter assumes the properties we call vital may not some day be artificially brought together."

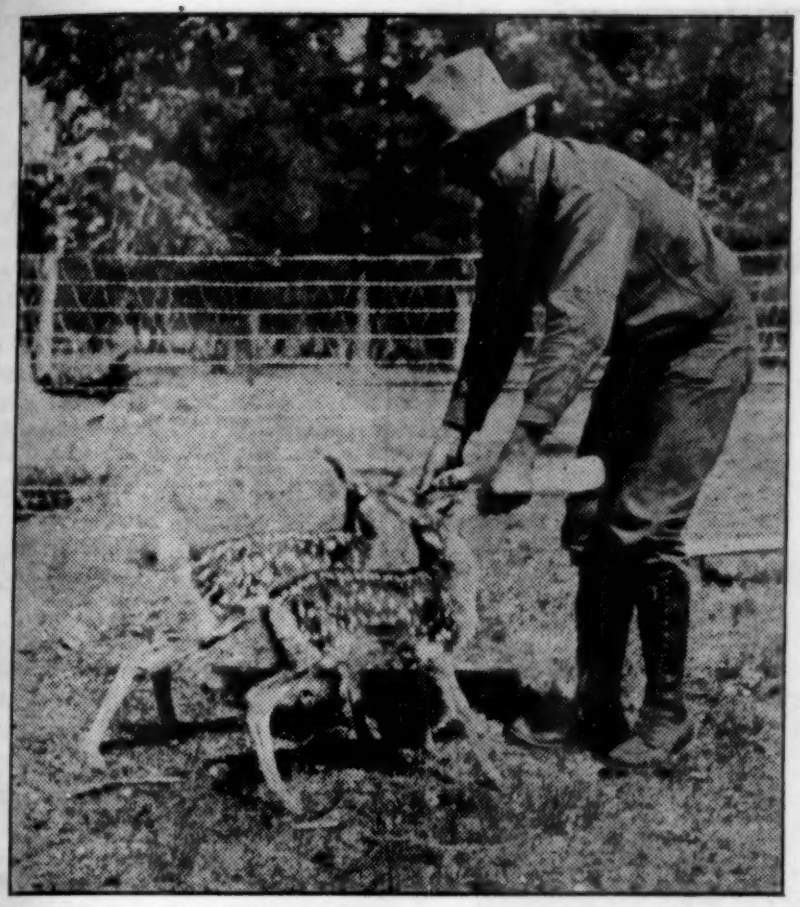
In the fifty-seven years since Huxley expressed these views much has been accomplished in artificial synthesis by chemists but Prof. Johnson concludes: "We have still a long road to travel and not until the composition and structure of our cell constituents can be more thoroughly established than is possible at present, can we hope to anticipate the realization by Huxley."

A creature capable of living on sulphur and air was mentioned by Prof. Johnson. This creature is a bacillus which dwells in sulphurous water and thrives on it. It has no need for sunlight as do other plants for it gets its energy from the combustion of free sulphur which it converts into sulphuric acid. It can live and even grow in a solution of sulphuric acid of normal strength that is fatal to most vegetation. Some such simple and self-sufficient organism, capable of living entirely on inorganic materials, may well have been the earliest form of life on earth, and the connecting link between the mineral and vegetable kingdoms. These sulphur bacteria take the form of long threads or active spirals. They grow in the soil and sometimes are found in a muddy pool in such luxuriance as to give it a purple hue. Researches now in progress on these curious creatures may throw light on the way by which sulphur gets from the soil up into the plant cells and so may be of practical value to the modern agriculturist.

More Woe For The Bugs

A new fumigant that deals inexpensive death to clothes moths, beetles, grain weevils and other insects withhout the fire risk or the endangering of human life present in the use of other fumigants was announced by R. T. Cotton and R. C. Roark, of the Bureau of Chemistry, U. S. Department of Agriculture. It has a long name, ethyl ester of monochloroacetic acid, and is not yet produced commercially. As used, it is mixed with an equal quality of the common chemical carbon tetrachloride. Three to four pounds allowed to volatilize will kill the insects in a closed space of a thousand cubic feet. In cost it will compare favorably with those fumigants now in use, selling for about thirty cents a pound. It was predicted that the new fumigant will save many lives now lost through the use of deadly hydrocyanic acid gas. No fire danger is present in the use of the new insecticide, whereas carbon disulphide now commonly used in grain fumigation is dangerously explosive when mixed with air.

For iron, eat peas, beans and other fresh legumes. This is the dietary advice provided by data presented by Dr. W. H. Peterson of the University of Wisconsin to the chemists. In the course of his researches he has analysed many foodstuffs for their iron content and he found that in general the legumes rank highest. Dried fruits, cereals, nuts and meats are all fairly high in iron, but fish, milk, potatoes, onions, fresh fruits have little of this food factor which is believed to encourage the growth of red corpuscles in the blood.



MERE MAN CAN BE A GOOD NURSE if occasion requires. This Forest Ranger is bottle-feeding a pair of orphan twin fawns, in the Kaibab National Forest, near the Grand Canyon of Arizona

American Game Returning

(*Continued from page* 178)

ranges other species are also thriving. The American elk, or wapiti, have increased from 52,704 to 72,165 in the national forests, and to this figure must be added the northern Yellowstone National Park herd, estimated at between 17,000 and 20,000 head. The elk once ranged over the whole of America east of the rockies, but now are found in large numbers only in the Yellowstone region.

The size of the Yellowstone Park bison herd has been limited only by the available range. There were only 25 or 30 of these animals in the little nucleus brought to the park a generation ago, but now there are 800 of them, and surplus animals have to be given away every year. This is the best known of the surviving bison herds, but not the largest. The province of Alberta, in Canada, has about ten times that many in a single buffalo park, and across the line, in Athabasca province, there are over 3,000 more. The American Bison Society, which reports these figures, states that the total known number of pure-blooded bison now in the world, including scattered single specimens in zoos, is something over 16,000.

The Pronghorn Struggles to Survive

The bison's one-time companion on the western plains, the pronghorn antelope, almost suffered the fate of its ponderous compeer during the days of reckless slaughter. Now it is being tenderly cared for, and no hunting whatever is permitted anywhere. As a result, the pronghorn also is coming back. Mr. Barnes' figures show 2,394 at the beginning of his five-year period, and 7,094 at its close. To this must be added a few hundreds in the national parks and in private posession, notably the herd of about 300 in Yellowstone Park.

About moose much less is known. They are shy animals, and never were abundant even in pioneer days. But figures in Mr. Barnes' table show an increase from 3,649 to 6,061. Mountain goats multiplied from 10,000 to almost 18,000. Mountain sheep, on the other hand, just held their own at about 13,000.

Refuges Succor Water Fowl

Big game animals have not been alone in their uneven contest with man. The migratory game birds are beginning to feel the pressure for winter quarters and food. In 1919 the U. S. Biological Survey first drew public attention to the alarming shrinkage of lakes and ponds as the result of the drainage programs in the West. Deprived of winter resting and feeding places thousands of migrating birds have died of starvation and of disease that spreads rapidly through the thousands concentrated in the patches of open water that are left. To a certain extent this situation has been appreciated and there is a growing demand for the conservation and maintenance of water areas.

One of the results of this reaction has been the establishment of the Upper Mississippi Refuge, a stretch of swamp and marsh some three hundred miles in extent between Rock Island, Illinois, and Wabasha, Minnesota. This territory will be a refuge and breeding ground for thousands of marsh birds of the Mississippi Valley as well as for fish and fur-bearing animals like otter and muskrat.

Western Birds in Danger

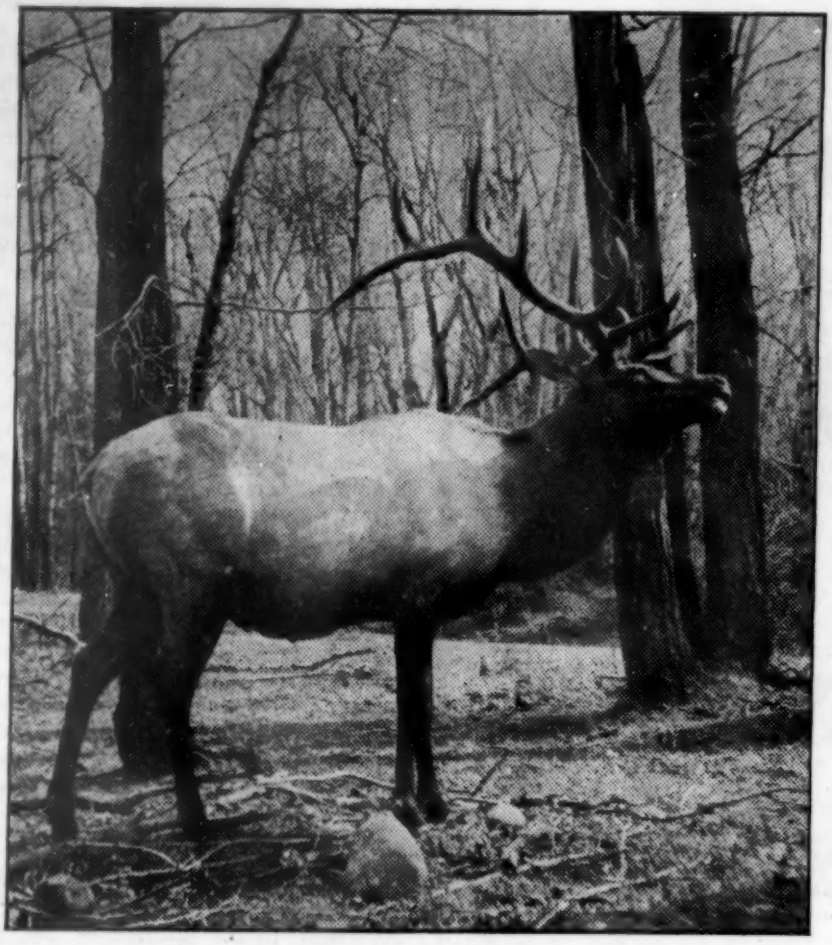
The ducks and geese of the West are the birds in greatest danger of depletion, in the opinion of Dr. Edward W. Nelson, chief of the U. S. Biological Survey. Drainage operations in combination with several years of scanty rainfall have dried up the lakes and ponds in the Rocky Mountain region so that there are few places where the migrating birds can break their long journey. The concentration of alkali in the evaporating water has resulted in a disease known as duck sickness, which has killed millions of ducks in the last few years of comparative drought. The danger to the perpetuation of wild fowl is so great, according to Dr. Nelson, that there is vital need for sportsmen and lovers of wild life to unite in a program of constructive work to insure the future of migrating game birds in these sections.

Conditions Favorable in East

In the eastern states the situation is much better. Reports made to the Biological Survey not only show that there is no scarcity of either ducks or Canada geese in states east of the Mississippi, but that in some sections, notably around the Potomac River and Chesapeake Bay, game birds are present in abundance.

The beautiful wood duck, which was threatened with extinction some

(*Just turn the page*)



AMERICAN ELK, OR WAPITI, bugling. This is the finest member of the deer family; it once ranged practically the whole of this country, but is now restricted to a small area around Yellowstone National Park

American Game Returning

(*Continued from page* 183)

years ago, is beginning to increase again, Biological Survey officials declare. The wild turkey is still fairly abundant in some states but is disappearing from its old haunts in others. Ruffed grouse, or partridge as it is more commonly called, have been dying in large numbers in New England and as far west as Michigan of some disease whose origin is at present unknown. Dr. A. A. Allen of Cornell University is investigating the malady with the hope that some means of checking its spread will be found.

Though bob-white have been gradually disappearing from the North in the last few years they are still common in the South. Quail have always been susceptible to cold and they have to a certain extent been replaced in the northeastern states by the ringnecked pheasant. Quail farming has been tried out, but the cost of the individual bird runs up from $10 to $17 apiece; so that stocking covers from such artificial sources is too costly to be practical.

Pheasants Praised and Condemned

Severe criticism and enthusiastic praise of the imported ringnecked pheasant are about equally divided. Farmers in New York and Iowa and other sections accuse the handsome birds of digging up corn. The pugnacious cocks are said to drive out other game and even to attack poultry. On the other hand farmers in Washington and Oregon, where they were introduced much earlier than they were in the East, value them highly and will not permit them to be hunted on their property.

What might fairly be called the rarest bird in the United States is the whooping crane, which cannot be shot even to add to scientific collections. The tallest and most striking of North American birds it attracted much attention from early ornithologists on account of its fantastic flight antics and grotesque dances. It is said that its call note or whoop could be heard on the prairies three miles away. At present there are thought to be only a few pairs in existence that breed in the swamps along the Louisiana coast.

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Sir Oliver Lodge Expounds His Cosmogony

By James Stokley

Following is a continuation of the report of the meeting of the British Association for the Advancement of Science, cabled from Leeds.

One of the sensations of the meeting of the British Association for the Advancement of Science at Leeds was the exposition by Sir Oliver Lodge of his ideas of the nature and structure of the fundamental stuff of the universe.

The universe, declared the aged philosopher-scientist, is not a creation in the commonly accepted sense, for it has always existed and probably always will. So far as the physicist can see, the universe is a "going concern, not yet run down, perhaps not destined to run down."

If it should come to such a state of entropy, of dead inertia, of complete run-down-ness, he asked, could it be wound up again, and what would do the winding?

Sir Oliver answered his own questions: "Yes, it could be wound up again. An Intelligence would do the winding. Clerk Maxwell imagined an intelligence contrivance whereby quick molecules could be sorted out from slow ones. Thus one chamber or compartment of an apparatus could be made hot and another cold without the expenditure of any energy. There may be the beginnings of something of supreme importance in this concept."

The sum-total of energy in the universe, Sir Oliver continued, must be simply untold, boundless. We do not know yet when the energy in a single atom is completely discharged. The atom of radium, for instance is "usually quiet, but once in a century or so it fires off a projectile. It may take a thousand years before it fires one, but once it has started it fires off four more, and then becomes 'dead.' But who knows whether it has exhausted all its heat and energy then? Indeed it is now pretty certain that it has not. Even ordinary inert pieces of matter, like a lump of lead or even a glass of water, contain vast stores of energy locked up among their atoms, only waiting for the releasing trigger, as a haystack waits for a match."

Where Electrons Come From

Sir Oliver's idea of the natural universe is a space filled with a substantial entity, fluid in its nature, but outside our present ken. It transmits waves, is the seat of electric and magnetic fields, and is in "a violent state of spinning and is the seat of an immensity of energy such as has never been imagined."

When the continuity of this fluid is interrupted by a minute cavity a strain is set up. The cavity is an electron and the strain is an electric field. The stuff from the cavity is not destroyed, but spins around under the influence of the force which extracted it. The strain causes a gyration of the particles, which accumulates to form matter as we perceive it. Sometimes the particles reunite and cancel each other, the matter disappearing in a burst of energy.

The veteran physicist expressed a strong disbelief in the doctrine of materialism, but does not believe that the term "vital energy" is justified.

"I do not think that life is a form of energy, in the sense that it can be transmuted into other forms. There seems to be a guiding principle *ad extra*—from the outside—which interacts with the material universe but yet is not of it. The universe must contain many things beyond the scope of physical science. Though we may be silent about them we need not make the absurd blunder of denying their existence. Physical science is not comprehensive of all reality."

New Data On Cosmic Rays

Prof. Robert A. Millikan of the California Institute of Technology, Pasadena, told of his latest researches on the penetrating cosmic rays. The new researches were conducted in a lake high up in the mountains, with apparatus eight times as sensitive as that formerly used. With Dr. Millikan was associated Dr. C. H. Cameron. They found the rays to be twice as penetrating as the first determination indicated. The radiation penetrated to a depth of one hundred twenty feet in the lake, and this depth in water is the equivalent in stopping power of eleven feet of solid lead. The rays are three times as powerful at the summit of Pike's Peak as they are at sea level.

Just what these penetration rays signify is as yet completely unknown. Without question they pass through and through man and all his works, through all living things, every moment of the day and night. But no trace of physiological effect has ever been detected. So far as we know, they are just part of our normal environment.

Dr. Werner Kolhoerster, German pioneer in the investigation of the cosmic rays made famous in America by Dr. Millikan, reported his researches, following Dr. Millikan. On the whole the results independently arrived at by the two workers are in agreement. Dr. Kohlhoerster has paid especial attention to the direction from which this mysterious radiation comes. There is some indication that the rays are most intense from the direction of the Milky Way, especially from the constellations Hercules and Andromeda, but he is unable to say what astronomical body or bodies might be their source.

Scientists Differ With Bishop

Reminiscences of the famous controversy between Thomas Henry Huxley and Bishop Wilberforce in the days when the Darwinian theory was young were aroused Sunday when, at a church service attended by the president and officers of the Association the Bishop of Ripon suggested that the sum of human happiness would not be diminished if all laboratories were to be closed for ten years and the time and money devoted to promoting mutual understanding among nations and men. The scientists were not long in responding to this opinion. Their point of view was typically expressed by Sir Richard Gregory, editor of *Nature*. He said: "It would be far better if the bishops, instead of devoting all their time in preparation for a life on the other side of the Jordan, would themselves give particular attention to means of producing a new heaven and a new earth here below."

X-Rays And Genetics

Dr. F. A. E. Crew indicated one way in which science can be of great assistance to human life. He predicted that animal breeders will in the future make use of X-rays to regulate heredity to suit themselves. "X-rays are the very tool to use in exploring the hereditary constitution of animals and plants of economic importance," he declared. "It is no longer necessary to await mutations arising naturally to obtain experimental stock; we shall be able to manufacture a series of artificial

(Just turn the page)

Lodge Explains Cosmogony

(*Continued from page* 185)

strains. It may soon be possible to order sufficient mutations at will, to give the breeder of domestic stock the powers of full control needed for his complete success. There is no reason to assume, however, that X-rays alone will do this. There are doubtless many other chemical and physical agencies that will do the same thing."

In another paper before the section on zoology Prof. Crew told of his observations on a newly evolved hairless mouse. The animal's normal coat is developed in infancy, but the hair is all shed when the mouse is three weeks old. The males of this strain have normal powers of reproduction, but the females are sterile unless they are kept at a temperature of eighty-eight degrees Fahrenheit. Internally, the animals are found to have abnormal thyroid glands.

Freud and all his works were flung overboard by Dr. William Brown, in his presidential address before the psychology section. Cases of multiple personality are now less common, he pointed out, and this coincides with a decreasing use of hypnotism in psychoanalysis. There is a danger in this psychological instrument, he asserted, for a patient liable to suffer from dissociated personality is peculiarly subject to hypnosis, and the hypnotist is likely to insert the opening wedge.

Taming the Zuyder Zee

Holland is about to increase the territory subject to her jurisdiction by a total of ten per cent. But this conquest will not involve firing a shot or losing a human life in war. Dr. K. Jansma, secretary of the Zuyder Zee Board, told how the Zuyder Zee is being drained and turned into a new province. A great dike three hundred feet wide at the base and rising twenty-five feet above the water surface at its crest is being built. It will carry a railroad along its top. The total cost will be thirty-seven million dollars. The cost of drainage, subsidiary dikes, compensation to fisheries and other interests injured, will run the whole project to a cost of two hundred million, but Holland figures that the five hundred and fifty thousand acres of land reclaimed from the ocean will be worth it.

More Palestine Quakes

The Holy Land may expect to suffer from earthquakes for millions of years to come, Prof. Bailey Willis, Stanford University seismological expert, told the Association in describing his experiences during the disastrous quake that occurred in Palestine July 11. The area around Jerusalem is a region of potential earthquake danger, he explained, like Japan and parts of California. The Bible records seismic disturbances, and they have occurred from time to time in the centuries since. A fault line along which earth slippage may occur passes directly through the Mount of Olives.

Dr. Willis has the reputation of being present at earthquakes. He was visiting Santa Barbara, California, during its 1925 shock and he inspected the Palestine disaster just a day after its occurrence. The July earthquake was not as severe as many others in history, Professor Willis explained, although much damage was done because of flimsy construction of the buildings. Modern houses made of bricks and mortar, even when they were not of first class workmanship, withstood the shocks.

The Psychology of Wit

Appreciation of wit, a quality that an American superstition credits with being entirely lacking in Englishmen, was the subject of a paper by Dr. Ll. Wynn-Jones, British psychologist. His researches have shown that for English school children and university graduates wit furnishes one very good test of intelligence. "It does not follow," he said, "that one's capacity to appreciate wit cannot be improved even if it be admitted that one's intelligence cannot be improved."

Darwin's House To Be Shrine

Darwin's home as an international scientific shrine is now a realized fact. Early in the sessions of the Association this step was proposed and greeted with enthusiasm by both the British and visiting scientists from other lands. An offer to purchase the house and to establish an endowment for its upkeep was made by Dr. Buckston Browne, a retired London Surgeon, and at its closing session the Association authorized its president, Sir Arthur Keith, to accept this offer. The total outlay involved will be between sixty and seventy-five thousand dollars. Sir Arthur has suggested that a part of the permanent endowment be set aside to establish an annual Buckston Browne Prize for the best contribution to biological science during each year, the prize to be awarded by the Council of the British Association.

The Darwin house is located at the town of Down, and is still in the possession of the Darwin family. The plan is to restore it to the same condition in which it was when the famous biologist lived in it.

Science News-Letter, September 17, 1927

Civilization need not destroy us. If we suffer it will be because we refuse to recognize that man is himself the greatest of all subjects for study that the universe has as yet produced, and that we know less of his nature and capabilities than of many aspects of the natural world toward which our investigations have been directed.

—*John C. Merriam.*

Science News-Letter, September 17, 1927

The mummy of a horse buried 3,000 years ago was found near Cairo, Egypt.

Sunlight falling upon the earth in a day exerts a weight of more than 100,000 tons.

The black, or house rat, a native of southern Asia, began to spread over the world about 1200 A. D.

Soft, fat, white worms from the maguey or pulque plant are fried and eaten like potato chips in Mexico.

Ojibway Indians sometimes visited the graves of persons who had died 40 years earlier in order to honor and remember them.

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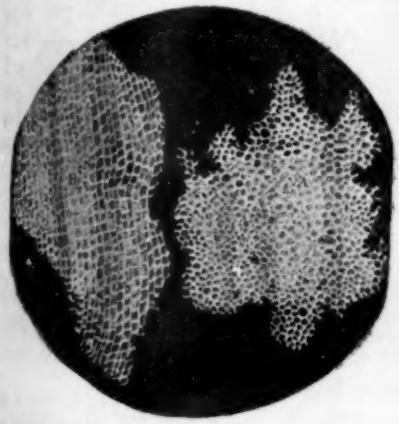
Classics of Science

The News-Letter begins in this issue to reprint some of the classic experiments and observations of science. They will as a rule be those which can be repeated today with the simplest apparatus. Hooke's discovery of the cellular structure of plants, which appears below, requires only a piece of cork, a razor blade, and a school microscope.

Discovery of Plant Cells



MICROGRAPHIA, by Robert Hooke, London, MDCLXV. Observ. XVIII. Of the Schematisme or Texture of Cork, and of the Cells and Pores of some other such frothy Bodies.

I took a good clear piece of Cork, and with a Pen-knife sharpen'd as keen as a Razor, I cut a piece of it off, and thereby left the surface of it exceeding smooth, then examining it very dilligently with a *Microscope,* me thought I could perceive it to appear a little porous; but I could not so plainly distinguish them, as to be sure that they were pores, much less what Figure they were of: But judging from the lightness and yielding quality of the Cork, that certainly the texture could not be so curious, but that possibly, if I could use some further diligence, I might find it to be discernable with a *Micrsocope,* I with the same sharp pen-knife, cut off from the former smooth surface an exceeding thin piece of it, and placing it on a black object Plate, because it was it self a white body, and casting the light on it with a deep *plano-convex Glass,* I could exceeding plainly perceive it to be all perforated and porous, much like a Honey-comb, but that the pores of it were not regular; yet it was not unlike a Honey-comb in these particulars.

The Schematisme of Cork

First, in that it had a very little solid substance, in comparison of the empty cavity that was contain'd between, as does more manifestly appear by the Figure A and B of the XI. *Scheme,* for the *Interstitia,* or walls (as I may call them) or partitions of those pores were neer as thin in proportion to their pores, as those thin films of Wax in a Honey-comb (which enclose and constitute the *sexangular cells*) are to theirs.

Next, in that these pores, or cells, were not very deep, but consisted of a great many little Boxes, separated out of one continued long pore, by certain *Diaphragms,* as is visible by the Figure B, which represents a sight of those pores split the long-ways.

Pores First Discern'd

I no sooner discern'd these (which were indeed the first *microscopical* pores I ever saw, and perhaps, that were ever seen, for I had not met with any Writer or Person, that had made any mention of them before this) but me thought I had with the discovery of them, presently hinted to me the true and intelligible reason of all the *Phaenomena* of Cork; As,

First, if I enquir'd why it was so exceeding light a body? my *Microscope* could presently inform me that there was the same reason evident that there is found for the lightness of froth, an empty Honey-comb, Wool, a Spunge, a Pumice-stone, or the like; namely, a very small quantity of a solid body, extended into exceeding large dimensions.

Next, it seem'd nothing more difficult to give an intelligible reason, why Cork is a body so very unapt to suck and drink in Water, and consequently preserves it self, floating on the top of Water, though left on it never so long: and why it is able to stop and hold air in a Bottle, though it be there very much condens'd and consequently presses very strongly to get a passage out, without suffering the least bubble to pass through its substance. For, as to the first, since our *Microscope* informs us that the substance of Cork is altogether fill'd with Air, and that that Air is perfectly enclosed in little Boxes or Cells distinct from one another. It seems very plain, why neither the Water, nor any other Air can easily insinuate it self into them, since there is already within them an *intus existens,* and consequently, why the pieces of Cork become so good floats for Nets, and stopples for Viols, or other close Vessels.

(Just turn the page)

NATURE RAMBLINGS

By Frank Thone

Fringed Gentian

Most fall flowers are of necessity hardy and therefore somewhat tough; they must be, to withstand the heat and drought of late summer days and the chill of the early frosts by night. The gentian, however, has somehow managed to be hardy without looking it, and to carry into the thinning woods of autumn the surprising delicacy and brightness of spring. It is like some women, who are middle-aged in their twenties and suddenly blossom into youth in their thirties.

Always a favorite with poets, the fringed gentian has had to suffer for being celebrated. It has never been a very abundant flower, and hosts of people have read poems about the fringed gentian without ever having seen one. Naturally then, when a fringed gentian is found by a flower lover of the type who shows his appreciation of flowers by tearing them from their roots and carrying them home to die, it is almost certain to be pounced on. Fortunately a better spirit is coming to prevail, the few gentians we have left are getting a better chance for their lives, and here and there one finds movements on foot to establish wild flower refuges. A remnant may yet be spared.

Though the eastern species of fringed gentian is rare, there is a form in the Rocky Mountains that is very abundant. One of the sights that repays a trip to Yellowstone Park almost as much as the geysers and canyons and waterfalls, is the miraculous blue of field on field of gentians.

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According to a Toltec legend, a god, indignant because the moon was as bright as the sun, flung a rabbit in its face and dimmed its radiance.

The delicate coloring of the famous hot springs terraces in Yellowstone National Park is due to the presence of minute hot-water plants.

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Classics of Science

(*Continued from page* 187)

And thirdly, if we enquire why Cork has such a springiness and swelling nature when compress'd? and how it comes to suffer so great a compression, or seeming penetration of dimensions, so as to be made a substance as heavie again and more, bulk for bulk, as it was before compression, and yet suffer'd to return, is found to extend it self again into the same space? Our *Microscope* will easily inform us, that the whole mass consists of an infinite company of small Boxes or Bladders of Air, which is a substance of a springy nature, and that will suffer a considerable condensation. - - -

But, to return to our Observation. I told several lines of these pores, and found that there were usually about threescore of these small Cells placed end-ways in the eighteenth part of an Inch in length, whence I concluded there must be neer eleven hundred of them, or somewhat more then a thousand in the length of an Inch, and therefore in a square Inch above a Million, or 1166400. and in a Cubick Inch, above twelve hundred Millions, or 1259712000. a thing almost incredible, did not our *Microscope* assure us of it by ocular demonstration. - - -

Pores in Other Vegetables

Nor is this kind of Texture peculiar to Cork onely; for upon examination with my *Microscope*, I have found that the pith of an Elder, or almost any other Tree, the inner pulp or pith of the Cany hollow stalks of several other Vegetables: as of Fennel, Carrets, Daucus, Bur-docks, Teasels, Fearn, some kinds of Reeds, &c. have much such a kind of *Schematisme*, as I have lately shewn that of Cork, save onely that here the pores are rang'd the long-ways, or the same ways with the length of the Cane, whereas in Cork they are transverse. - - -

Now, though I have with great diligence endeavored to find whether there be any such thing in those *Microscopical* pores of Wood or Piths, as the *Valves* in the heart, veins, and other passages of animals, that open and give passage to the contain'd fluid juices one way, and shut themselves, and impede the passage of such liquors back again, yet have I not hitherto been able to say any thing positive in it; though, me thinks, it seems very probable, that Nature has in these passages, as well as in those of Animal bodies, very many appropriated Instruments and contrivances, whereby to bring her designs and ends to pass, which 'tis not improbable, but that some dilligent Observer, if help'd with better *Microscopes*, may in time detect.

Science News-Letter, September 17, 1927

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The Chinese had a serviceable compass before the time of Columbus.

Symptoms of hookworm disease were described by physicians of ancient Egypt.

ZOOLOGY

Planting Fish By Billions

By Lewis Radcliffe

U. S. Deputy Fish Commissioner

We have become accustomed to billion dollar Congresses and we are beginning to discuss billionaires. Difficult as it may seem of achievement, we are now stocking our waters annually with billions of fry, fingerling, and adult fish. These are the output of Federal, State and private hatcheries. Nearly every state has at least one hatchery, and the Federal government has 70 stations and substations all the way from Afognak, Alaska, to Boothbay Harbor, Maine; from Duluth, Minn., to San Marcos, Texas.

In 1926 the output of the U. S. Bureau of Fisheries fish-cultural stations and of the rescue fields bordering the Mississippi aggregated 5,232,000,000 fish and eggs, according to a recent report by Glen C. Leach. The forty-four species propagated include nearly every important food and game fish in our waters. Because of the increased demand for fish of the fingerling sizes, the output was increased more than 100 per cent., totaling nearly 300,000,000. Another important phase of the Bureau's work included the salvaging of about 150,000,000 fishes which had become stranded in land-locked pools along the upper Mississippi.

Fish-culture is becoming more and more an exact science. The modern fish-culturist talks in terms of pond fertilization, the use of forage fish for food for the game fishes, use of foods rich in vitamins, and the free use of the thermometer to prevent his brood from being subjected to too sudden changes in temperature.

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BIOLOGY

Ultra-Violet Bad For Yeast

The old adage, "What is one man's meat is another's poison," has been well illustrated by the effects of ultra-violet rays on the sugar solutions in which yeast cultures are grown. Experiments performed by Drs. J. W. Woodrow, A. C. Bailey and E. I. Fulmer of Iowa State College show that if the flasks of nutrient liquid in which the minute plants are subsequently to be grown are exposed for a number of hours to the invisible radiations, they become definitely poisonous to the yeast cells, markedly decreasing their rate of growth. This is completely contrary to the results obtained by irradiating the food of animals, which have been shown to generate beneficial vitamins under such treatment.

Science News-Letter, September 17, 1927

ANTHROPOLOGY

Rime of the Races

Behold, my child, the Nordic man,
And be as like him as you can:
His legs are long, his mind is slow,
His hair is lank and made of tow.

And here we have the Alpine race:
Oh, what a broad and brutal face!
His skin is of a dirty yellow.
He is a most unpleasant fellow.

The most degraded of them all
Mediterranean we call.
His hair is crisp, and even curls,
And he is saucy with the girls.

—*Hilaire Belloc.*

Science News-Letter, September 17, 1927

ASTRONOMY

Smaller Domes Now Possible

The great dome, 100 feet in diameter, which covers the world's largest telescope at Mt. Wilson in California, could be made less than 40 feet in diameter, if the instrument were made according to new plans of Dr. G. W. Ritchey. Dr. Ritchey was formerly at the Mt. Wilson Observatory and designed the big telescope there. He has been working for several years at the Paris Observatory.

At a recent meeting of the French Academy of Sciences he presented the first model of what he terms an "aplanatic telescope" Like the great California telescope this is a reflector, where a mirror takes the place of the the solution of the problem of conlens of more familiar instruments. A concave mirror reflects the star light back towards the star to a smaller mirror, from which it travels back again, through a hole in the big one, to the eye of the observer.

Dr. Ritchey and Henri Chretien, with whom he has been working, have discovered a new method of making the mirrors, by means of which the telescope can be made much shorter than by older methods. In the model, the mirror is about 16½ inches in diameter, though the entire telescope is less than 4 feet long.

It is expected that the new system will greatly reduce the cost and simplify the construction of still larger telescopes that are planned. F. G. Pease, who was associated with Dr. Ritchey at Mt. Wilson, has made preliminary plans for one with a 300-inch mirror, to cost possibly $12,000,000, while Dr. Ritchey himself has been interested in a big one to be placed in the Alps.

Science News-Letter, September 17, 1927

BACTERIOLOGY

T. B. Vaccine To Be Tested

The preventive tuberculosis vaccine that has been developed by Dr. Albert Calmette, director of the Pasteur Institute at Paris, is about to be tried out on herds of dairy cattle in England, through the cooperation of the British veterinary ministry of health.

The vaccine is known as BCG, from the names of its discoverers, Dr. Calmette and Dr. M. Guerin of the Pasteur Institute at Lille. It consists of an attenuated strain of bovine tubercle bacilli that have, after years of cultivation on beef bile medium, somewhere in the succeeding generations lost their virulence, though they still apparently retain their power to confer immunity.

The vaccine will be used in selected herds in which tuberculosis is known to be present. All calves will be vaccinated within two weeks after they are born. The operation will be repeated every twelve months, over a period of five years. By that time most of the older and tuberculous cows will have been worked out of the herds. At the end of this period the herds will, it is expected, consist largely of adults that have been kept free from infection by vaccination.

Science News-Letter, September 17, 1927

HYGIENE

Arsenic in Tobacco

A hitherto unsuspected source of arsenic is pipe tobacco. Dr. Roe E. Remington of the North Dakota Agricultural College in a report to the American Chemical Society, told of a man who was excreting from three to four-tenths of a milligram of arsenic per day—a very large amount. He tried to find its source, and ultimately discovered that the man was an inveterate pipe-smoker. The analysis of pipe tobacco showed that various samples contained as much as a grain or a grain and a half per pound. If taken in one dose, that is enough arsenic to kill a man.

Since a large number of pipe smokers seem to be thriving, Dr. Remington's discovery does not appear particularly alarming, although further work may show that continued small doses of arsenic are harmful. He does not know the source of the arsenic in tobacco. It might come from the soil or from arsenic sprays.

Science News-Letter, September 17, 1927

Spiders are fond of eating butterfly eggs.

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170 Ethics
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200 RELIGION—
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220 Bible
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240 Devotional. Practical
250 Homiletic. Pastoral. Parochial
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280 Christian churches and sects
290 Ethnic. Non-Christian
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First Glances at New Books

WORLD WEATHER RECORDS — Edited by H. H. Clayton—*Smithsonian Misc. Coll. v. 79* ($3). This work amply merits the application of that somewhat overworked word, "monumental." It is the result of the labors of many compilers scattered over a world systematically parcelled out for them to comb for weather records. They have done their task completely; this book contains literally every weather record worthy of the name, not only from such to-be-expected places as Washington and Rome and Medicine Hat, but from stations of which Americans at least have never ever dreamed. If you want to know what the rainfall was in Quetta during the summer when Jack Barrett died there, or if you are curious about the temperature at Jacobshavn, Greenland, when Peary raced for the Pole, you will find it all here. There is romance as well as painstaking science in these rows of figures.

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INTERNATIONAL HEALTH BOARD, 13TH ANNUAL REPORT—*Rockefeller Foundation.* The workers of the Rockefeller Foundation go about the world uttering in whispers dramas that are worthy of thunder and the roaring of great seas. Yellow fever, malaria, hookworm control, rural health organization, public health education—these drab chapter heads tell more than pompous names of battles and sounding titles of treaties. War slayeth its thousands, these men save their tens of thousands.

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THE ANALYSIS OF MATTER—Bertrand Russell—*Harcourt, Brace* ($6). An exceptionally useful and timely book since it gives a clear presentation, with no more mathematics than necessary, of the strange theories which have in the last few years swept so far beyond Einstein as to make the theory of relativity in its primitive form seem tame and conventional. Mr. Russell is one of the few modern thinkers who is sufficiently familiar with mathematics, metaphysics and physics to be able to handle critically the debatable borderland where these three realms join. Also he is gifted with power to employ picturesque analogies that illuminate the tortuous pathway for those who fail to follow the logical steps of his procedure.

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ARCHÆOLOGY

Vikings Were Business Men

The Swedish Viking was not merely a feared raider. He was also a businesslike trader. This fact has been demonstrated by archæological discoveries, and Swedish scientists have concluded that while the written sagas lay greater emphasis on the warlike exploits, the unwritten record dug up from beneath the ground presents a better-balanced picture. In other words, the Viking has been a victim of contemporary yellow journalism on the part of the "skalds" or minstrels. The more sober modern scientists have set out to right the balance.

Even in the Bronze Age, long before the Viking Era, Sweden had an active foreign trade, the archæological finds disclose, so that the traditions of regular Swedish imports and exports are at least 3,500 years old. Ancient implements, weapons, coins and pottery found in Sweden prove that the inhabitants entertained trade relations with their neighbors on the European continent as early as 6,000 years ago. These relations attained their heyday about 1500 to 1300 B. C. The art, ornaments, designs and habits of the Mediterranean peoples strongly influenced the Swedes, though the latter developed them into an independent and national Swedish culture.

The main export articles of Sweden during those ancient times were furs, wool, dried fish, iron and iron ore, horses and probably beeswax, the last item showing that the Swedes have kept bees since the beginning of historic times. The existence of commercial relations with countries as distant as Spain, Italy, and Constantinople are proved by thousands of Frankish, Anglo-Saxon, Arabian, Persian, Byzantine, Roman and German coins and ornaments found in the soil of Sweden. These coins were not brought to Sweden as war booty, but in regular and organized trading extending all over Europe.

Sweden's international relations were also kept alive by the contact between the home country and Swedish emigrants and settlers abroad. Thus in the year 375 Swedes penetrated as far south as the Black Sea and founded an Austro-Gothian dominion. Others settled on the British Islands and in Normandy. Headed by the great statesman and warrior Rurik, one group went east across the Baltic and founded the empire of Russia, named after the coast district of Roslagen near Stockholm.

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EDUCATION

College Catalogues

By FRANCIS J. OPPENHEIMER

Granting that the student-body is everything it is accused of being by the University presidents, it certainly cannot be held responsible for the catalogues issued by these institutions which prove as much as anything else how far scholarship has wandered away from the time-tested unities with which thought once concerned itself. Giovanni Gentile himself, a Professor of Philosophy in the University of Rome, correctly accuses the Universities of being philosophical only at "certain hours of the day."

Without exception these "house organs," present one jumble of "subjects" after another, all wrenched violently from the heart of knowledge, which is another way of saying that our University "authorities" do not even possess a bowing acquaintance with one another's work. Nor, need it be said, are their various classroom topics harmonious parts of one majestic philosophical fugue sweeping up the human spirit along with it, although as originally instituted the Universities were dedicated to nothing less ambitious or less noble.—Quotation from *The New Tyranny—Boni.*

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EVOLUTION

A Thermophilous Mutation

An instance of evolution in a laboratory bottle, with a small aquatic animal producing offspring that can thrive only at abnormally high temperatures, was described before the Fifth International Genetics Congress at Berlin recently by Dr. A. M. Banta and T. R. Wood.

The two scientists were conducting a series of experiments at the Station for Experimental Evolution at Cold Spring Harbor, N. Y., in which huge numbers of a minute water animal known as Cladocera had to be reared. They noticed that the brood of one of the animals were not doing very well, and they tried putting the bottle in which they were growing into a warmer place. At once the little creatures began to thrive and multiply. Further observations brought out the fact that the new race demanded for its best growth a water temperature considerably above that which its parent species found most suitable for its life processes. and this preference for being "always in hot water" was handed down from generation to generation.

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Everyone Loves a Good Fighter

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Henry David Thoreau
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Edward Livingston Trudeau
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